



Presentation created by Josef Feuerstein 09.10.2010

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Introduction – initial situation

CheckBox is a solution to extract geometrical data, non geometrical data and drawings from NX-Parts for comparison, to detect differences between these parts.

Ever NX Version change raises the following questions:

- Does “**my data**” change because of the conversion to the new NX version?
- Can “**my data**” still be opened, update, edit and saved?
- Is “**my data**” in the new version in the same way manageable as in the current productive version?

This questions can only be answered when the “**own data**” is verified through appropriate methods!

A manual verification is very comprehensive and requires a **huge amount of time**. In addition, the tests are only successful if such manual checks are performed systematically. The **immense time** required for manual testing in practice leads to the fact that this part of the conversion is usually treated only superficially.

To answer these questions the software **CheckBox** was developed in cooperation with the companies **BSH, KBA, MTU, Renk, ASML** and **S-PLM**

Introduction – initial situation

The goal:

Developing of a tool that answers the following question:

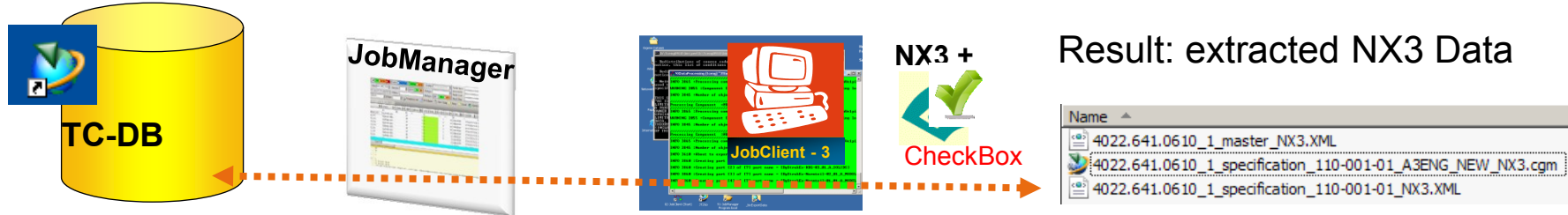
Are the data in the new version the same as in the old version?

The following slides show you the concept on how to check the data in a save way with the help of the CheckBox and the PLMJobManager.

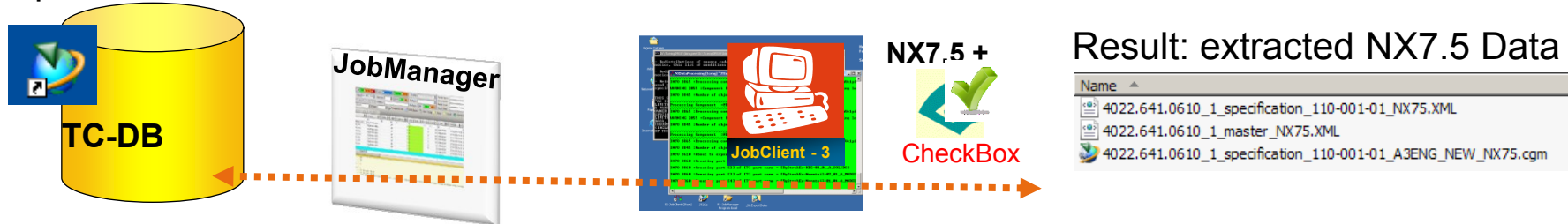
Introduction CheckBox Process Overview

How is CheckBox working?

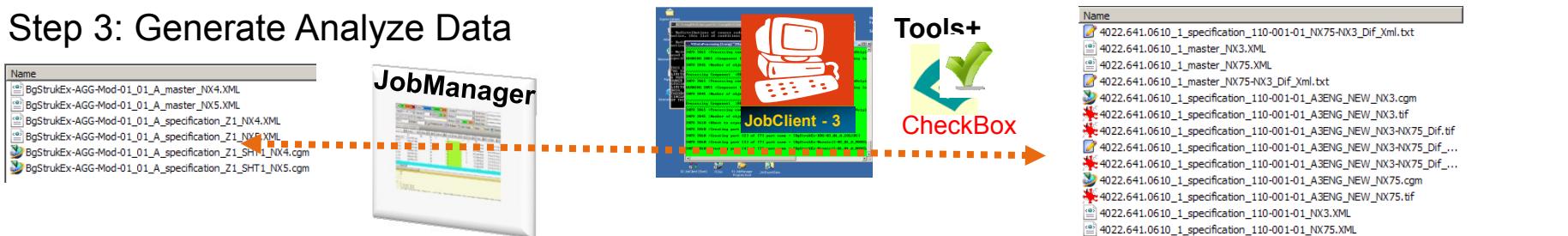
Step 1: Extraktion NX3 Data



Step 2: Extraction NX7.5 Data



Step 3: Generate Analyze Data



Introduction CheckBox Data Extraktion

After extracting CheckBox Data the CB.Log files is analysed an the results are listed as partial Results. The following list shows how we do classify the CheckBox extraction Results.

- PL = Part load 1
- UF = Update all Feature 2
- UD = Update Drawing 3
- PH = Part Header 4
- MD = Model Data 5
- AS = Assembly Data 6
- DR = Drawing Data 8
- EN = Entity 9
- CBXml = CB.Data File (xml) 9
- CGM = Drawing .cgm Files 10

The results of extracting data is imported into the JobServer Database.

```
[677] done init program result file
[680] single_part = #D:\NxData\BgStrukNx75\BgStrukEx-Einzeltei
[721] Loading part
Info: Memory Load = 33
Info: dwAvailPhys = 11109156
Info: dwAvailPageFile = 26648496
Info: dwAvailVirtual = -586564

=====
Start Check at Sat Feb 02 14:49:28 2013

[496] partname = #D:\NxData\BgStrukNx75\BgStrukEx-Einzelteil-0
Info: Part = D:\NxData\BgStrukNx75\BgStrukEx-Einzelteil-04_dwg
Info: xml_file = D:\NxData\BgStrukNx75\BgStrukEx-Einzelteil-04
[537] xmlfile = #D:\NxData\BgStrukNx75\BgStrukEx-Einzelteil-04

=====
[541] do the update
Update: All Features 2
Update: All Features ---> passed
Update: Drawing views 3
Update: Drawing views ---> passed
[543] done the update

=====
Info: init_xml_file
Info: init_xml_file --> passed
Info: write_xml_header
Info: write_xml_header --> passed
Info: Part Header Section 4
Info: Part Header Section --> passed
Info: Check_Model Section 5
Info: Check_Model Section --> passed
Info: Check_Assembly Section 6
Info: Check_Assembly Section --> passed
Info: Check_Drawing Section 7
Info: Check_Drawing Section --> passed
Info: Check_Entities Section 8
Info: Check_Entities Section --> passed
Info: write_xml_end Section 9
Info: write_xml_end Section --> passed

=====
CGM: Output (Sheet 1) to [D:\NxData\BgStrukNx75\BgStrukEx-Ein
CGM: Cgm_Def_Color_Option = UF_PLOT_BLACK_ON_WHITE 10
CGM: Cgm_Def_Color_Option = UF_PLOT_BLACK_ON_WHITE --> passed
=====
Finished checking at Sat Feb 02 14:49:31 2013
```

Introduction CheckBox Compare Data

```
<> PLMJobManager_CheckBoxData.xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" type="CheckBoxData" />
#<< ProgramData
#<< RunData
  StartLoadPartDateTime: 2010-05-22 12:07:13
  EndLoadPartDateTime: 2010-05-22 12:07:15
  StartLoadPartMemoryAllocation: 1843576
  EndLoadPartMemoryAllocation: 1842232
  << Action
    DetailOption: 2,3,4,5,6,7,8,26
    StartUpdateDateTime: 2010-05-22 12:07:15
    UpdateAllFeaturesReturn Value: -1
    StructureSyncReturn Value: -1
    UpdateAllViewsReturn Value: -1
    EndUpdateDateTime: 2010-05-22 12:07:15
    StartDateTime: 2010-05-22 12:07:15
  << NxData
    NXRelease: NX 5.0
    NXVersion: 5.0
  << AssemblyDataOptions
  << CheckBoxData
    << PartHeader
    << ModelData
      << Refsets
        << Refset
          Name: Entire Part
          Volume: 1342.584642
          VolumeBodies_n: 2
          Feature3D_n: 0
          << CentreOfGravity
          << MomentOfInertia
        << Refset
          Name: ModelDataBase
          << Layers
      << AssemblyData
        << PartArrangements
        << Components
      << Drawings
        << Drawing
          Name: SHT1
          ViewDependentObjects_n: 0
          RetainedObjects_n: 0
          Drawing_Views_n: 4
          << Views
        << Drawing
      << Entities
        << Entity xsi:type="Entity_Type26_SubType2"
        << Entity xsi:type="Entity_Type26_SubType1"
    << RunDataPerformance
      EndDateTime: 2010-05-22 12:07:15
```

```
<> PLMJobManager_CheckBoxData.xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" type="CheckBoxData" />
#<< ProgramData
#<< RunData
  StartLoadPartDateTime: 2010-05-26 17:58:00
  EndLoadPartDateTime: 2010-05-26 17:58:01
  StartLoadPartMemoryAllocation: 1753136
  EndLoadPartMemoryAllocation: 1751792
  << Action
    DetailOption: 26
    StartUpdateDateTime: 2010-05-26 17:58:01
    UpdateAllFeaturesReturn Value: -1
    StructureSyncReturn Value: -1
    UpdateAllViewsReturn Value: -1
    EndUpdateDateTime: 2010-05-26 17:58:01
    StartDateTime: 2010-05-26 17:58:01
  << NxData
    NXRelease: NX 5.0
    NXVersion: 5.0
  << AssemblyDataOptions
  << CheckBoxData
    << PartHeader
    << ModelData
      << Refsets
        << Refset
          Name: Entire Part
          Volume: 1342.584642
          VolumeBodies_n: 2
          Feature3D_n: 0
          << CentreOfGravity
          << MomentOfInertia
        << Refset
          Name: ModelDataBase
          << Layers
      << AssemblyData
        << PartArrangements
        << Components
      << Drawings
        << Drawing
          Name: SHT1
          ViewDependentObjects_n: 0
          RetainedObjects_n: 0
          Drawing_Views_n: 4
          << Views
        << Drawing
      << Entities
        << Entity xsi:type="Entity_Type26_SubType2"
        << Entity xsi:type="Entity_Type26_SubType1"
    << RunDataPerformance
      EndDateTime: 2010-05-26 17:58:01
```

Compare → having Diff's?

YES

NO

Create extended Data:

- DifReport.txt
- Dif.tif
- Merge.tif
- MergeCgm.prt

Result Is OK

Result is an Error:
In this case it is
required to Check
what is the reason for
this differences

Introduction CheckBox Details off Extracted XML Data

Job Data:

- [-] <> ProgramData
 - [-] ProgramName: NxCheckBox
 - [-] ProgramRelease: V1.1.1.18
 - [-] BuildDate: (May 20 2010)
 - [-] CustomLicense: unknown
- [-] <> RunData
 - [-] StartLoadPartDateTime: 2010-05-26 17:58.00
 - [-] EndLoadPartDateTime: 2010-05-26 17:58.01
 - [-] StartLoadPartMemoryAllocation: 1753136
 - [-] EndLoadPartMemoryAllocation: 1751792
 - <> Action
 - [-] DetailOption: 26
 - [-] StartUpdateDateTime: 2010-05-26 17:58.01
 - [-] UpdateAllFeaturesReturn Value: -1
 - [-] StructureSyncReturn Value: -1
 - [-] UpdateAllViewsReturn Value: -1
 - [-] EndUpdateDateTime: 2010-05-26 17:58.01
 - [-] StartDateTime: 2010-05-26 17:58.01
- [-] <> NxData
 - [-] NXRelease: NX V5.0
 - [-] NXVersion: 105.0
 - [-] <> AssemblyLoadOptions
 - [-] load_options: 1 [UF_ASSEM_load_from_search_dirs]
 - [-] parts_list: 0
 - [-] update: 1 [UF_ASSEM_update_report]

ModelData:

- [-] <> ModelData
 - [-] <> Refsets
 - [-] <> Refset
 - [-] Name: Entire Part
 - [-] Volume: 1342.584642
 - [-] VolumeBodies_n: 2
 - [-] Feature3D_n: 0
 - [-] <> CentreOfGravity
 - [-] X: 10.078155
 - [-] Y: 7.560351
 - [-] Z: 1.238954
 - [-] <> MomentOfInertia
 - [-] X: 815346.315993
 - [-] Y: 1455367.113393
 - [-] Z: 2220782.513485
 - [-] <> Refset
 - [-] <> ModelDataBase
 - [-] <> Features
 - [-] TotalFeatures_n: 0
 - [-] AliveFeatures_n: 0
 - [-] SuppressedFeatures_n: 0
 - [-] CondemnedFeatures_n: 0
 - [-] DeletedFeatures_n: 0
 - [-] TemporaryFeatures_n: 0
 - <> Bodies

Component:

- <> Components
 - [-] <> Component
 - [-] <> Component
 - [-] File: %UGMGR=V3.2 PH=QnBdUZwmVe1p
 - [-] Handle: RM%UL=V1.0 PH=wTDdUZwmVe
 - [-] SuppressState: 0
 - <> SuppressByExpression
 - <> ReferenceComponent
 - [-] RefsetCurr: EINFACH
 - [-] InstanceName: BGSTRUKEX-KBG-01_01
 - [-] ComponentLevel: 2
 - [-] Callout: 10
 - [-] MemberCount: 59
 - [-] <> ComponentArrangement
 - [-] UsedArrangement: Arrangement 1
 - <> Mating
 - [-] <> Matrix
 - [-] X1: 1.000000
 - [-] Y1: 0.000000
 - [-] Z1: 0.000000
 - [-] X2: 0.000000
 - [-] Y2: 1.000000
 - [-] Z2: 0.000000
 - [-] X3: 0.000000
 - [-] Y3: 0.000000
 - [-] Z3: 1.000000
 - [-] originX: 360.000000
 - [-] originY: -420.000000
 - [-] originZ: 0.000000

Introduction CheckBox Details of Difference Report

DifReport.txt

```

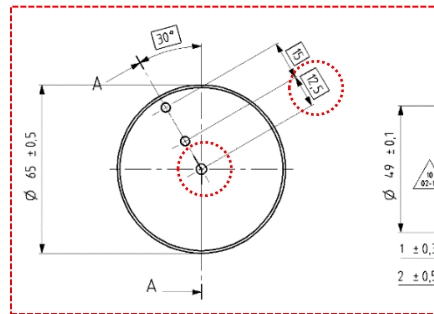
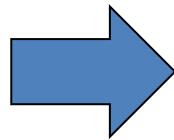
0      10      20      30      40      50      60      70      80      90      100     110     120     130     140     150
1 CheckBox Report:
2 JM CheckBoxVer...:V2.696 (Build:26.10.2010)
3 Date.....:26.10.10 22:37:10
4
5 CheckBox.Data 1:[NX V3.0[103.0]] |CheckBox.Data 2[NX V7.5[107.0]]
6 -----|-----
7 CliName.:[@DB/4022.625.4014/2/specification/110-001-01] |CliName.:[@DB/4022.625.4014/2/specification/110-001-01]
8 PartDesc: |PartDesc:
9 PartHis.:~ |PartHis.:25 19 Oct 10 00:55 NT Intel jfeuerst NX 7.5.1.5 - External U~
10 PartHis.:24 18 Oct 10 22:29 NT Intel jfeuerst NX 3.0.3.2 - External ~|PartHis.:24 29 Jul 10 11:47 NT Intel JFeuerst NX 7.5.0.32 (NX Manager~
11 PartHis.:23 10 May 10 17:00 NT Intel gmiddel NX 3.0.3.2<!<OT_PUB>!> |PartHis.:23 10 May 10 17:00 NT Intel gmiddel NX 3.0.3.2<!<OT_PUB>!>
12 PartHis.:22 10 May 10 16:41 NT Intel gmiddel NX 3.0.3.2<!<OT_PUB>!> |PartHis.:22 10 May 10 16:41 NT Intel gmiddel NX 3.0.3.2<!<OT_PUB>!>
13 PartHis.:21 10 May 10 16:32 NT Intel gmiddel NX 3.0.3.2<!<OT_PUB>!> |PartHis.:21 10 May 10 16:32 NT Intel gmiddel NX 3.0.3.2<!<OT_PUB>!>
14 -----|-----
15 Data extraction info: |Data extraction info:
16 NxVer...:NX V3.0[103.0] |NxVer...:NX V7.5[107.0]
17 NxCB.Rel:V1.1.1.18 Build:(Aug 27 2010) |NxCB.Rel:V1.1.1.18 Build:(May 20 2010)
18 Date....:18.10.10 22:29:51 |Date....:19.10.10 00:55:03
19 =====|=====
20 CheckBox Compar Result:
21 ResultIsErr.....:True
22 ResultHasWarning...:True
23 ResultCode.....:64
24 ResultCodeBinary.:64
25 ResultMsgShort....:[PH:OK] [MD:OK] [AS:OK] [DR:OK] [EN:64 Msg:Err:Origin] [Pef:OK]
26 =====|=====
27 CheckBox compar report:
28 PartHistoCheck: OK
29 Warning:DR(32):[ViewDependentObjects_n].[A3ENG_NEW]:[Value Differ(<>)]!
30 |->NX V3.0[103.0]: 74
31 |->NX V7.5[107.0]: 73
32 ++Error:EN(64):[Origin]:[X:[240.553540] Y:[291.117523] Z:[0.000000]]
33 |->NX V3.0[103.0]: [Type:[26] Subtype:[3] Desc:[UF_dim_parallel] Name:[ Handle:[RM%UL=V1.0 PH=gBmdYwshQS4FxA AUID=Rgod6KgTQS4FxA R0000820300000018]
34 | Origin:[X:[153.753462] Y:[241.003475] Z:[0.000000]] Texts:[12,5]]
35 |->NX V7.5[107.0]: [X:[153.753462] Y:[241.003475] Z:[0.000000]]
36 Warning:EN(64):[Texts.Text]:[61,66]
37 |->NX V3.0[103.0]: [Type:[26] Subtype:[3] Desc:[UF_dim_parallel] Name:[ Handle:[RM%UL=V1.0 PH=gBmdYwshQS4FxA AUID=Rgod6KgTQS4FxA R0000820300000018]
38 | Origin:[X:[153.753462] Y:[241.003475] Z:[0.000000]] Texts:[12,5]]
39 |->NX V7.5[107.0]: [12,5]
40 PerfDif.LoadPart.Factor>1.2 Warning:4.00sec(Nx7.5)/1000msec(Nx3)=4.0[PerfDifFactor]

```

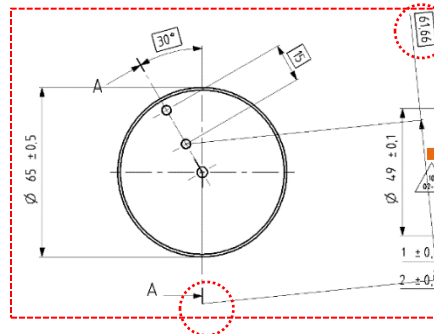
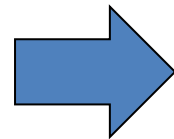
Introduction CheckBox Analyze Data Compare Drawings

CheckBox extracts CGM files from specifications. These CGM files are used to create output data.

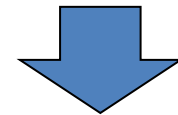
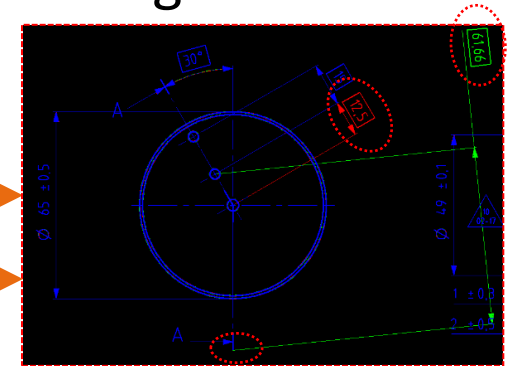
NX3.cgm



NX7.5.cgm



Merge.tif



From this file we extract the **PPM** (Parts per Million) value which shows if drawings have differences.

The Merge.tif image file is also be used to see quick differences between drawings.

This method was developed by Thomas Körner from B/S/H.

Introduction CheckBox Analyze Data Compare CB.xml files

All analyzed Data from XML and from Drawing compare will be combined to one Result:

- PH = Part Header (from XML) 1
- MD = Model Data (from XML) 2
- AS = Assembly Data (from XML) 3
- DR = Drawing Data (from XML) 4
- EN = Entity Data Dim/Text (from XML) 5
- PPM= Dif.tif (from Drawing compare) 6

- If the Result Value is = 0 no differences between the part's are found.

Example:

[PH:OK] [MD:OK] [AS:OK] [DR:OK] [EN:OK] [PPM:OK]

1 2 3 4 5 6

- If the Result Value is > 0 there are differences between the Parts → the Parts must be checked !

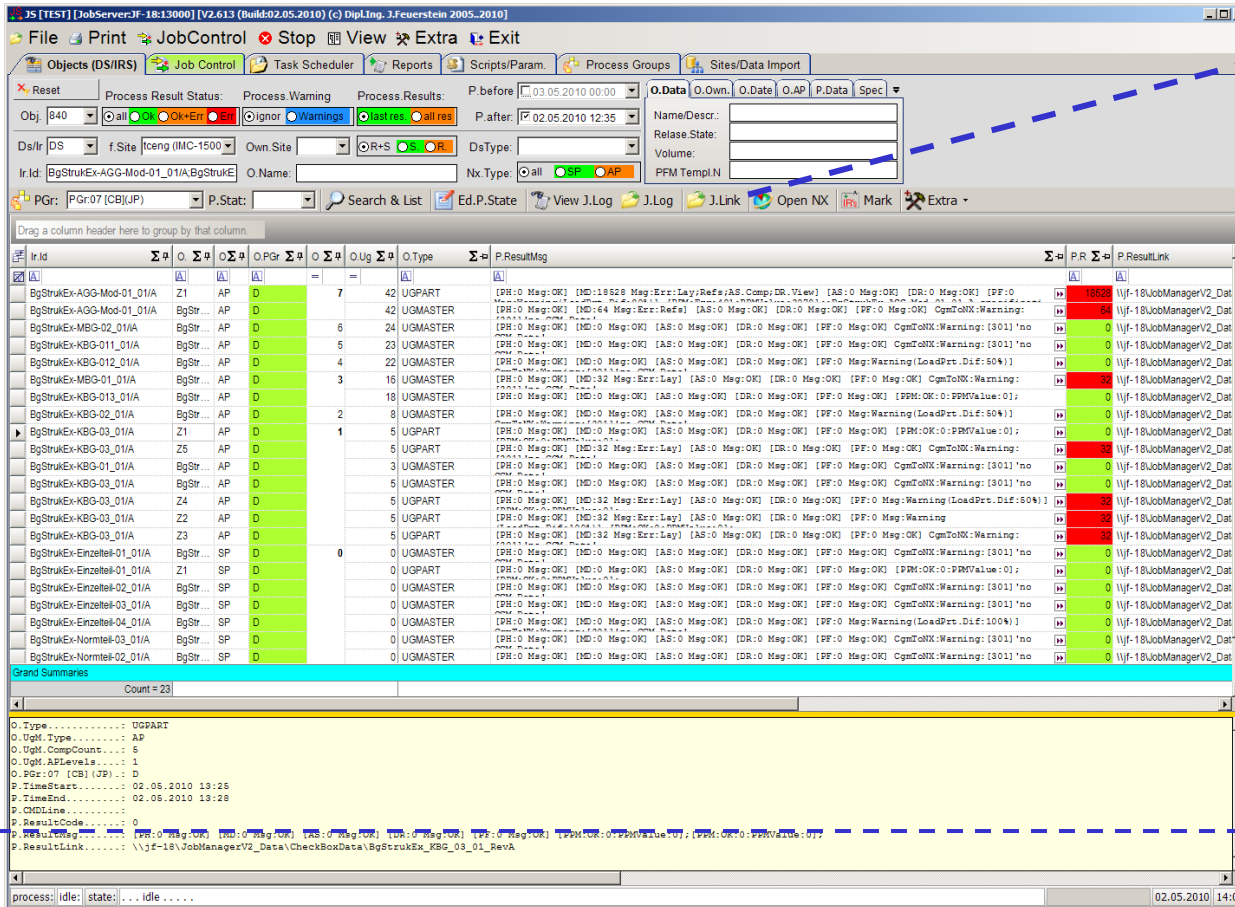
Example:

[PH:OK] [**MD:ERR:Lay;Refs;AS.Comp;DR.View**] [AS:OK] [DR:OK] [EN:OK] [**PPM:3078**]

1 2 3 4 5 6

Introduction CheckBox Analyze Data Get Entire Results

All Result's are view via PLMJobManager



Grand Summaries

Count = 23

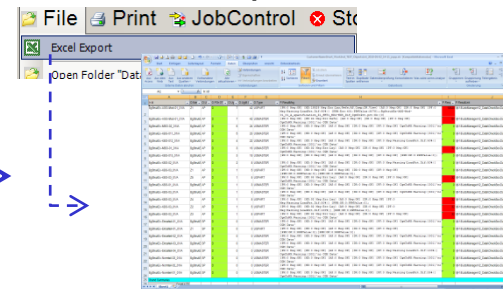
O.Type: UGPART
 O.Ugm.Type: AP
 O.Ugm.CompCount: 5
 O.Ugm.AzLevel: 1
 O.PGr: 07 (CB) (JP)
 P.TimeStart: 02.05.2010 10:26
 P.TimeEnd: 02.05.2010 10:28
 P.CMDLine: ...
 P.ResultCode: 0
 P.ResultMsg: [PR:0 Mag:OK] [ND:0 Mag:OK] [AS:0 Mag:OK] [DR:0 Mag:OK] [PF:0 Mag:OK] [PMT:OK:0:PRMValue:0] [PRM:OK:0:PRMValue:0]
 P.ResultLink: \\j18\JobManagerV2_Data\CheckBoxData\BgStrukEx_KBQ_03_01_RevA

Via J.Link you have a Quick access to all Data

Adresse: \\j18\JobManagerV2_Data\CheckBoxData\BgStrukEx_AGG_Mod_01_01_RevA

Name	Größe
BgStrukEx-AGG-Mod-01_01_A_master_NX4.XML	81 KB
BgStrukEx-AGG-Mod-01_01_A_master_NX5_Dif Xml.txt	1 KB
BgStrukEx-AGG-Mod-01_01_A_master_NX5.XML	81 KB
BgStrukEx-AGG-Mod-01_01_A_specification_21_NX4NX5_Dif Xml.txt	59 KB
BgStrukEx-AGG-Mod-01_01_A_specification_21_SHT1_NX4.cgm	26 KB
BgStrukEx-AGG-Mod-01_01_A_specification_21_SHT1_NX4.tif	60 KB
BgStrukEx-AGG-Mod-01_01_A_specification_21_SHT1_NX4NX5_Dif.tif	16 KB
BgStrukEx-AGG-Mod-01_01_A_specification_21_SHT1_NX4NX5_Dif_CgmToPrt.prt	10 KB
BgStrukEx-AGG-Mod-01_01_A_specification_21_SHT1_NX4NX5_Dif_Histo.log	13 KB
BgStrukEx-AGG-Mod-01_01_A_specification_21_SHT1_NX4NX5_Dif_Merge.tif	704 KB
BgStrukEx-AGG-Mod-01_01_A_specification_21_SHT1_NX5.cgm	2 KB
BgStrukEx-AGG-Mod-01_01_A_specification_21_SHT1_NX5.tif	1.327 KB
BgStrukEx-AGG-Mod-01_01_A_specification_21_SHT1_NX5.tif	134 KB
BgStrukEx-AGG-Mod-01_01_A_specification_21_SHT1_NX5.tif	20 KB

You export the Data to Excel analyze the Result for own Report's



Benefits

Benefits for using NX CheckBox

- ✓ **Getting overview about NX – TC Software Quality**
- ✓ **Getting overview about your NX - TC Data Quality**
- ✓ **Helps to setup NX - TC customer settings**
- ✓ **Helps to find issues before designers working with the new NX – TC Version**
- ✓ **Helps to keep the value of PLM Data**
- ✓ **Reduces cost's “after upgrade” because Data and software issues can be better identified and solved before upgrade.**
- ✓ **Reduces Upgrade risks**

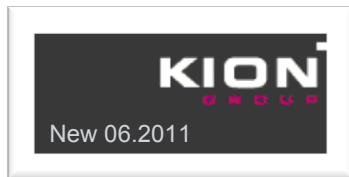


Introduction CheckBox Involved Company's

The CheckBox Software is developed by Mr. Bernd Schieber (SISW Stuttgart).
Software specification, project coordination and PLMJobManager integration was done by Mr. Josef Feuerstein (addPLM)

All Company's did spend 3 Day's of Services to SISW.

At the Meeting (on 28.04.2010) the participants' agreed that it is possible for another company to join this Project. To take part in this Project the new company has also to spend 3 Day's of Services on this project.
Info: The PLMJobManager Software is a separated Software and is not Part of the CheckBox Tool.



Mr. Michael Scheltens
Mr. Peter Angenendt



Mr. Thomas Körner
Mr. Krzysztof Duszkiewicz
Mr. Karl Bertram



Mr. Bernd Schieber



Mr. Josef Feuerstein
Mr. Sascha Güth



Mr. Maarten Romers



Mr. Norbert Zimmert
Mr. Michael Conrad



Mr. Ulrich Lange
Mr. Helmut Wirth



Mr. Dr. Christian Fedrowitz
Mr. Martino Rigotti

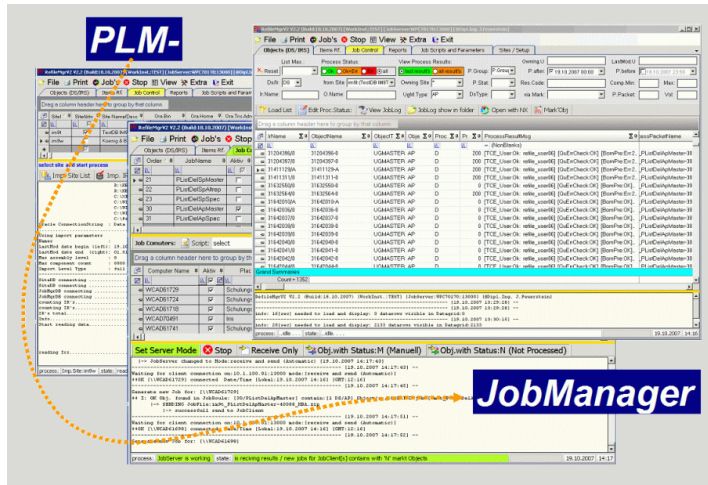


Mr. Stefan Auer



Mr. Reinhard Lange
Mr. Rolf Wendschlag

System requirements



JobServer:

- WinXP or Win7 Workstation
- W2003 or W2008 Server



JobClient:

- WinXP or Win7 Workstation
- W2003 or W2008 Server
- with Full Nx- und TC- installation